

ESTIMATING THE ROCK MASS MODULUS OF MISSOURI SHALE USING PRESSUREMETER TESTS

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ABSTRACT

Rock mass modulus can be a useful property in the design of foundations. The stress strain response of the rock mass can be estimated by directly measuring the stress strain relationship via in-situ field tests, such as the pressuremeter, or it can be estimated from the results of laboratory intact specimen tests. Intact laboratory test results are often reduced to account for imperfections or discontinuities and other properties of the rock mass that may be present in the entire system, but are not easily replicated in the lab. Shale formations found in Missouri are typically sensitive to changes in moisture content and disturbance from sampling and sample preparation. Generally lab tests are only performed on samples that can withstand the disturbances associated with sampling and preparation. The pressuremeter test (PMT) offers a potentially better method to assess the in-situ rock mass modulus. Pressuremeter tests were performed at five sites in Missouri and the results were reduced to yield rock mass modulus. Intact samples of shale recovered from each site and returned to the laboratory for unconsolidated undrained and unconfined triaxial tests to yield intact modulus values. In general, the moduli from the intact specimens were equal to or less than the in-situ moduli measured using the pressuremeter. In these practical cases, the moduli from the intact specimens did not require any reduction to provide rock mass modulus. Rather, the moduli from the intact specimens could be used directly as the rock mass moduli. This result is surprising, but not unheard of.